dimerLight

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ABSTRACT

Researchers at the University of California, Davis have developed an innovative platform for creating genetically encoded fluorescent biosensors capable of 1) assessing the formation of GPCR homo and heterodimers, and 2) determining how dimerization impacts protomer conformation in response to ligands.The UC Davis IPN has developed a suite of ~24 biosensors based on GPCR dimers.Collectively called, dimerLights, these modular biosensors have the ability to identify novel dimeric drug targets and assess the impact of ligands on their conformations.In addition to the ~24 biosensors that UC Davis has already developed, the modular platform in principle can easily be adapted to enable the discovery and evaluation of broader GPCR homo/heterodimers than have been tested so far.

FULL DESCRIPTION

This technology encompasses GPCR-based biosensors that incorporate a circularly permuted green fluorescent protein (cpGFP) into the GPCR protomer, which is further genetically engineered to form an irreversible linkage to putative dimer partners.A fluorescent readout enables detection of high and low efficiency dimerization processes.Once a suitable dimer has been identified, the resulting biosensor can detect conformation changes in the GPCR protomer by changes in cpGFP fluorescence.This technology drastically simplifies methodology for identifying GPCR homo/heterodimers and evaluating the effects of ligands on their conformations.Thus, this technology facilitates high-throughput screening of small molecules designed to target GPCR homo/heterodimers.

APPLICATIONS

- Pharmaceutical drug discovery and development for disorders involving GPCR homo/heterodimers.
- Screening platforms for hallucinogen detection and monitoring unwanted side effects.
- Development of novel antidepressants and neuroplastogens devoid of hallucinogenic side effects.
- Development of novel antipsychotics targeting GPCR homo/heterodimers
- Academic and biotech research on GPCR functional selectivity and biased agonism.

FEATURES/BENEFITS

- Enables detection of high efficiency dimerization events, increasing confidence in proposed GPCR dimer targets.
- Enables rapid, high-throughput screening and scores ligands in agonist and antagonist modes for their effects on GPCR dimer conformations.
- Distinguishes hallucinogenic from non-hallucinogenic ligands to guide safer therapeutic development.

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INVENTORS

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OTHER INFORMATION

KEYWORDS

antidepressant, antipsychotic, biosensor, drug discovery, GPCR, GPCR heterodimer, GPCR homodimer, hallucinogens, neuropsychiatric disorders, psychoplastogens, screening

CATEGORIZED AS

- **Medical**
  - Disease: Autoimmune and Inflammation

- Deploys broadly via genetically encoded expression in cells and animals (including viral-vector delivery).
- Replaces indirect assays by directly measuring ligand-specific GPCR dimer conformations.

PATENT STATUS

Patent Pending

- Disease: Blood and Lymphatic System
- Disease: Cancer
- Disease: Cardiovascular and Circulatory System
- Disease: Central Nervous System
- Disease: Dental
- Disease: Dermatology
- Disease: Digestive System
- Disease: Infectious Diseases
- Disease: Kidneys and Genito-Urinary System
- Disease: Metabolic/Endocrinology
- Disease: Musculoskeletal Disorders
- Disease: Ophthalmology and Optometry
- Disease: Respiratory and Pulmonary System
- Disease: Substance Abuse
- Disease: Women's Health

RELATED CASES

2026-409-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Novel Psychoplastogenic Tropanes for Treating Brain Disorders
- Combinations of Psychoplastogens and DYRK1A Inhibitors
- Iboga Entactogens
- Psychoplastogens For Treating Hearing-Related Disorders

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